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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/642,883	08/22/2000	Masato Koike	001035	8966

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EXAMINER

CHANG, AUDREY Y

ART UNIT	PAPER NUMBER
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2872

DATE MAILED: 03/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/642,883

Applicant(s)

KOIKE ET AL.

Examiner

Audrey Y. Chang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 January 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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DETAILED ACTION

Remark

- This Office Action is in response to applicant's amendment filed on January 27, 2003, which has been entered as paper number 17.
- By this amendment, the applicant has amended claims 1, 6 and 11.
- Claims 1-15 remain pending in this application.

Response to Amendment

1. The amendment filed on January 27, 2003 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: *claims 1, 6 and 11 have been amended* to include the feature of "static plane diffraction grating" that is not supported by the specification.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-15 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was *not described* in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed

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invention. The reasons for rejection based on the newly added feature are set forth in the paragraph above.

4. **Claims 1-15 are rejected under 35 U.S.C. 112, first paragraph**, as containing subject matter which was *not* described in the specification in such a way as to *enable* one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claims 1, 6 and 11 have been amended to add the phrase “for maximizing a diffraction efficiency of the radial area” however the specification and the claims fail to teach **what** and **how** the maximization of the diffraction efficiency is achieved. A grating profile having azimuthal dependence will **NOT** maximize the diffraction efficiency.

The specification and the claims also fail to what is considered to be a “static plane diffraction grating” when the grating is rotated.

Claims 2-5, 7-10 and 12-15 inherit the rejection from their respective based claims.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 1-2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Ishikawa.**

Ishikawa teaches a *rotatable optical disk* (10) having a *diffraction grating structure*, (being a plane grating as shown in Figures 4-6), that is comprised of a *plurality of grooves* formed on the surface of the grating such that the grooves have either blaze structure (Figure 6C) or rectangular structure

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(Figure 4), wherein it is implicitly true that the *profile* of the groove at radial area is dependent on the *azimuthal* position of the area with respect to the rotational axis, (please see Figures 4-6C).

Claim 1 has been amended to include the feature “for maximizing a diffraction efficiency of the radial area”. However no means for achieving such has been disclosed, (please see rejection under 35 USC 112, first paragraph above). Ishikawa teaches that the blaze angle may be changed to change the diffraction efficiency. It would have been obvious to one skilled in the art to modify the grating structure of Ishikawa to maximize the diffraction efficiency.

The rotatable plane diffraction grating taught by Ishikawa as described for claim 1 above has met all the limitations of the claims. Ishikawa teaches that the diffraction grating (2) has *blaze* grooves as shown in Figure 6C with a *blaze angle*. This reference however does teach *explicitly* about the diffraction properties defined by the claimed equations in relating to the angle of incident light, angle of diffraction light, the wavelength and the thickness of the grooves. However the claimed equations are simply the *standard* equations for describing the *diffraction phenomenon* of a diffraction blaze grating, they therefore can be deducted based on standard knowledge of the diffraction theory by one skilled in the art.

7. Claims 6, 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Ishikawa.

Ishikawa teaches a *rotatable* optical disk (10) having a *diffraction grating structure*, (being a plane grating as shown in Figures 4-6), that is comprised of a plurality of grooves formed on the surface of the diffraction grating such that the grooves has either blaze structure (Figure 6C) or rectangular structure (Figure 4), wherein it is implicitly true that the *profile* of the groove at *radial area* is dependent on the *azimuthal position* of the area with respect to the rotational axis, (please see Figures 4-6C). Ishikawa teaches that the incident light is shined at a radial area of the diffraction grating and the disk having the diffraction grating is rotatable presumable by any standard mechanism. However this reference

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does not teach explicitly that the incident light is a converging beam. But such modification is considered to be obvious matter of design choice to one skilled in the art for the purpose of allowing the rotary disc suitable for different type of incident light.

Claim 6 has been amended to include the feature “for maximizing a diffraction efficiency of the radial area”. However no means for achieving such has been disclosed, (please see rejection under 35 USC 112, first paragraph above). Ishikawa teaches that the blaze angle may be changed to change the diffraction efficiency. It would have been obvious to one skilled in the art to modify the grating structure of Ishikawa to maximize the diffraction efficiency.

With regard to claims 7 and 9, Ishikawa teaches that the diffraction grating (2) has blaze grooves as shown in Figure 6C with a blaze angle. This reference however does teach *explicitly* about the diffraction properties in terms of the cited equations in relating to the angle of incident light, angle of diffraction light, the wavelength and the thickness of the grooves. However the claimed equations are simply the *standard* equations for describing the diffraction phenomenon of a diffraction blaze grating, they therefore can be deducted based on standard knowledge of the diffraction theory by one skilled in the art.

8. Claims 11-12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Ishikawa in view of the patent issued to Ohkura et al (PN. 5,238,785).

Ishikawa teaches a *rotatable optical disk* (10) having a diffraction grating structure, (being a plane grating as shown in Figures 4-6), that is comprised of a plurality of grooves formed on the surface of the diffraction grating, such that the grooves has either blaze structure (Figure 6C) or rectangular structure (Figure 4), wherein it is implicitly true that the profile of the groove at radial area is dependent on the azimuthal position of the area with respect to the rotational axis, (please see Figures 4-6C).

This reference has met all the limitations of the claims with the exception it does not teach explicitly that the diffraction grating is formed by the method steps claimed. Ohkura et al in the same field of endeavor teaches a method for the manufacture of a diffraction grating wherein the method comprises the step of coating a photo-resist layer (42) on a substrate (31), the step of covering the resist partially with a semi-transparent mask (43), serves as the sector mask, the step of exposing the photo-resist layer and developing the layer to form a mask with intended diffraction grating pattern (45a) and the step of etching the substrate to form the diffraction grating pattern on the substrate, (please see Figures 3(a) to 3(e) and column 6). Ohkura et al teaches that the grating forming area is restricted by the semi-transparent mask, which implicitly means that the mask is moved around so that the full grating may be formed. It would then have been obvious to one skilled in the art to apply the teachings of Ohkura et al for the benefit of actually making the rotatable diffraction grating by the standard etching process.

Claim 11 has been amended to include the feature “for maximizing a diffraction efficiency of the radial area”. However no means for achieving such has been disclosed, (please see rejection under 35 USC 112, first paragraph above). Ishikawa teaches that the blaze angle may be changed to change the diffraction efficiency. It would have been obvious to one skilled in the art to modify the grating structure of Ishikawa to maximize the diffraction efficiency.

With regard to claims 12 and 14, Ishikawa teaches that the diffraction grating (2) has blaze grooves as shown in Figure 6C with a blaze angle. This reference however does teach *explicitly* about the diffraction properties in terms of the claimed equations in relating to the angle of incident light, angle of diffraction light, the wavelength and the thickness of the grooves. However the claimed equations are simply the *standard* equations for describing the diffraction phenomenon of a diffraction blaze grating, they therefore can be deducted based on standard knowledge of the diffraction theory by one skilled in the art.

Response to Arguments

9. Applicant's arguments, filed on January 27, 2003, with respect to claims 1-15 have been fully considered and they are not persuasive.

10. In response to applicant's arguments which states that the cited Ishikawa reference is applied in different field of art and the method of use differs greatly from the instant application, the examiner respectfully reminds the applicant that the field of art and the method of using are not part of the limitations of the claims which therefore cannot be relied to overcome the rejection. The claims of the instant application only recite a *diffraction grating*, where the Ishikawa reference also discloses a diffraction grating, which therefore is in same field of endeavor of the instant application.

11. In response to applicant's arguments, which state that the features in dependent claims 2, 7 and 12 are not standard equation for describing diffraction phenomenon, the applicant is encouraged to study any standard text for diffraction grating. The US patent issued to Blasiak et al teaches that a blaze grating with the known Littrow design has the blaze angle equals to the angle of incidence and to the angle of diffraction. This suggests that the blaze angle is the average of the angle of incidence and the angle of diffraction, (please see columns 2 and 4 and Figures 1-2). The equation in claims 2, 7 and 12 concerning the azimuthal angle is nothing but the coordinate transformation in the spherical coordinate when rotated through a non-zero azimuthal angle. This is a fact of trigonometry and specific geometric coordination system and is not considered an "invention".

12. Applicant's arguments concerning the newly added features have been fully considered and addressed in the paragraphs above.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 703-305-6208. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cassandra Spyrou can be reached on 703-308-1637. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

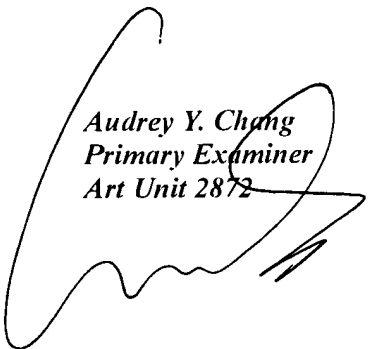
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

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A. Chang, Ph.D.
March 17, 2003



Audrey Y. Chang
Primary Examiner
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